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FILAMENTOUS FUNGI ASSOCIATED WITH LEAF SURFACES OF RED ALDER AND DOUGLAS FIR SEEDLINGS IN WESTERN OREGON

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During a study of the effects of ozone on leaf-surface microorganisms of red alder [*Alnus rubra* Bong.] and Douglas fir [*Pseudotsuga menziesii* (Mirb.) Franco] seedlings, many species of filamentous fungi were isolated and identified. No other study of red alder leaf-surface fungi has been made. Douglas fir needle-surface fungi were examined *in situ* by Bernstein & Carroll (1973) and Sherwood & Carroll (1974). Using cultural techniques the endophytic fungi of conifer needles including Douglas fir have been enumerated by Bernstein & Carroll (1977), Carroll, *et al.* (1977) and Carroll & Carroll (1978). Most of the fungi listed below have not been previously reported from this habitat.

Filamentous fungi were isolated from leaf surfaces of two year Douglas fir seedlings obtained from a local nursery and two year red alder seedlings which had been transplanted from their natural habitat. All plants were grown in chambers through which ozone was continuously blown at concentrations of 0, 5, 10 and 20 parts per hundred million. Red alder was sampled monthly throughout the growing season from 3 May 1975-3 November 1975 while Douglas fir was sampled from 3 May 1975-13 January 1976. Although both first and second year needles were used in the study, this age difference was not considered significant at the time and the data were pooled. Fresh tissue was washed twice in 0.1% Tween 20 and rinsed in sterile water. Serial dilutions of wash water were incorporated into Cooke Rose Bengal agar (Difco-Bacto), 2% malt agar (Difco-Bacto) and 2% soil extract agar (Difco-Bacto made with 500 ml water percolated through 75 g forest soil). Washed leaves (4 mm^2) and whole needles were placed on the same three kinds of media. After ten days filamentous fungi were subcultured, as they grew through the agar or from the tissue, and identified.

The following list of filamentous fungi is presented as base data for future work on the effects of air pollutants on the phyllosphere flora. Table I lists the filamentous fungi associated with leaf surfaces either actively or inactively as resting propagules. *Aureobasidium pullulans* was isolated most frequently from both red alder and Douglas fir, often

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occurring on 100% of the samples. All species listed were isolated at least twice. No attempt was made to identify the *Penicillium* species; many isolates produced only sterile mycelium.

TABLE I.

	Red Alder	Douglas Fir
Acremonium strictum W. Gams	X	-
Alternaria alternata (Fr.) Keissler	X	X
Arthrinium arundinis (Corda) Dyko & Sutton	X	-
Aspergillus clavatus Desm.	-	X
A. niger Van Tiegh	X	X
**Aureobasidium pullulans* (De Bary) Arnaud	X	X
Botrytis cinerea Pers. ex Pers.	X	X
Chaetomium cochliodes Palliser	X	-
C. elatum Kunze ex Fr.	-	X
C. funicolum Cooke	X	X
Cladobotryum verticillatum (S. F. Gray) Hughes	-	X
**Cladosporium cladosporioides* (Fresen) De Vries	X	X
**C. herbarum* (Pers.) Link ex S. F. Gray	X	X
C. macrocarpum Preuss.	X	X
**C. oxysporum* Berk. & Curt.	X	X
C. sphaerospermum Penz.	X	X
Curvularia lunata (Wakker) Boedijn	X	-
Cylindrocarpon obtusisporum (Cooke & Hark.) Wollenw.	-	X
Dinemasporium sp.	-	X
Emericella nidulans (Eidam) Vuill.	X	-
**Epicoccum purpurascens* Ehrenb. ex Schlecht.	X	-
Fusarium arthrosporioides Sherb.	X	-
F. tabacinum (Beyma) W. Gams	-	X
Gelasinospora tetrasperma Dowding	X	-
Gelatinosporium sp.	-	X
Geniculisporium sp.	X	-
Gliosporium sp.	X	-
Humicola fuscoatra Traaen	X	X
**Khuskia oryzae* Hudson	-	X
Melanconium sp.	-	X
Memnoniella echinata (Riv.) Falloway	X	X
Monocillium sp.	X	-
Monodictys castaneae (Wallr.) Hughes	-	X
Monodictys sp.	X	-
Monochaeta sp.	-	X
Mortierella ramanniana (Moel.) Linn. var. *angulispora* (Naumov) Linnemann	X	X
Nodulisporium sp.	X	X
Neurospora sitophila Shear & Dodge	X	-
Penicillium spp.	X	X
Pestalotia cfr. *clavispora* Atk.	-	X
P. microspora Sacc.	X	-
P. vaccinii (Shear) Guba	-	X
Phialophora hoffmannii (Beyma) Schol-Schwarz	X	X
P. verrucosa Medlar	X	-
Phoma glomerata (Corda) Wollenw. & Hochapf.	-	X
P. herbarum Westend.	-	X

Table I. (continued)	Red Alder	Douglas Fir
Rhizopus sp.	-	X
Scopulariopsis asperula (Sacc.) Hughes	X	-
S. brevicaulis (Sacc.) Bain.	X	X
S. brumptii Salvanet-Duval	X	-
Scytalidium lignicola Pesante	X	X
Selenophoma sp.	-	X
Septonema chaetospira (Grove) Hughes	-	X
Sordaria fimicola (Roberge) Ces. & De Not.	-	X
S. minima Sacc. & Speg.	-	X
Stephanosporium ceralis (Thüm.) Swart	-	X
Talaromyces luteum (Zukal) Benj.	X	-
Trichocladium asperum Harz	X	-
Trichoderma viride Pers. ex Fr.	X	-
Trichothecium roseum Link ex Fr.	X	X
**Ulocladium botrytis* Preuss.	X	X
U. chartarum (Preuss.) Simmons	X	X
Varicosporium sp.	-	X

*Previously reported to occur on Douglas fir needle surfaces (Sherwood & Carroll, 1974).

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